

Attorney Docket No. 54008.8064.US01
P00-0021

COMPLETE SET OF PENDING CLAIMS

1. (Currently Amended) A method for processing a workpiece, comprising the steps of:

providing a heated liquid at a temperature in the range of about 25-150° C onto a surface of the workpiece ~~that is to be treated, the heated liquid assisting in maintaining the workpiece at an elevated temperature;~~

introducing ozone into an environment containing the workpiece at a rate of at least 90 grams per hour;

controlling a thickness of the heated liquid on the workpiece so as to form a liquid layer that allows for diffusion of the ozone through the layer to the surface of the workpiece; and

reacting the ozone at the surface of the workpiece, to process the workpiece.

2. (Currently Amended) A method for cleaning a surface of a workpiece, comprising the steps of:

providing a heated liquid solution of water and at least one of HF and HCl onto the surface of the workpiece, with the heated solution assisting in maintaining the workpiece at ~~an elevated temperature~~ a temperature in the range of about 25-150° C;

introducing ozone into an environment containing the workpiece at a rate of at least 90 grams per hour;

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controlling a thickness of the heated liquid solution to form a thin liquid boundary layer on the surface of the workpiece to allow diffusion of the ozone through the boundary layer for reaction at the surface of the workpiece, to clean the workpiece.

3. (Original) The method of claim 1 where the ozone is introduced at a rate of at least 130 grams per hour.

4. (Original) The method of claim 1 where the ozone is introduced at a flow rate of at least 10 lpm and a concentration of at least 10% by weight.

5. (Original) The method of claim 1 wherein the liquid comprises deionized water.

6. (Original) The method of claim 5 wherein the deionized water is superheated.

7. (Original) The method of claim 1 wherein the liquid includes sulfuric acid, hydrochloric acid, ammonium hydroxide, or deionized water.

8. (Original) The method of claim 1 wherein the step of controlling comprises the step of rotating the workpiece.

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9. (Original) The method of claim 1 wherein the step of controlling comprises the step of rotating the workpiece at a rotation rate equal to or greater than about 300 rpm.

10. (Original) The method of claim 1 wherein the step of controlling comprises adding a surfactant to the liquid.

11. (Original) The method of claim 1 wherein the step of controlling comprises the step of spraying the liquid onto the surface of the workpiece at a controlled flow rate.

12. (Original) The method of claim 1 wherein the liquid includes water and HF at a concentration ratio of between about 50: 1 and 500: 1.

13. (Original) The method of claim 1 wherein the liquid includes water and HCl at a concentration ratio of between about 50: 1 and 500: 1.

14. (Original) The method of claim 1 wherein the liquid includes water, HF and HCl at a concentration ratio of between about 50: 1: 1 and 500: 1: 1.

15-16 (Cancelled)

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17. (Previously Presented) The system of claim 27 with the ozone supply system comprising a contactor for receiving the ozone and the liquid.

18. (Cancelled)

19. (Previously Presented) The system of claim 27 further comprising a rotor assembly in the chamber for rotating the workpiece.

20. (Previously Presented) The system of claim 27 where the ozone supply system generates a flow of ozone at a flow rate of at least 10 lpm and a concentration of at least 10% by weight.

21. (Previously Presented) The system of claim 27 where the heater comprises a steam boiler.

22. (Cancelled)

23. (Previously Presented) The system of claim 27 further comprising means for controlling a thickness of a liquid layer on the workpiece, including at least one of:

- a rotor for rotating the workpiece;
- a fluid flow controller or one or more nozzles adapted to generate fine droplets of the liquid.

24-25. (Cancelled)

26. (Currently Amended) A method for processing a workpiece, comprising the steps of:

~~providing a thin-heated~~ an aqueous liquid boundary layer onto a surface of the workpiece ~~that is to be treated, the heated liquid assisting in maintaining the workpiece at an elevated temperature~~ with the liquid boundary layer at a temperature in the range of 55-120° C;

introducing ozone into an environment containing the workpiece at a rate of at least 90 grams per hour;

controlling a thickness of the ~~thin-heated~~ aqueous liquid boundary layer to allow for diffusion of the ozone through the boundary layer and a ~~diffusion-controlled~~ reaction at the surface of the workpiece, to process the workpiece.

27. (Currently Amended) A system for processing a workpiece, comprising:

a process chamber;

~~means associated with the process chamber for forming a thin-aqueous liquid boundary layer on the workpiece;~~

an ozone supply system for ~~injecting~~ providing ozone directly or indirectly into the chamber, and having a capacity of at least 90 grams per hour, whereby the ozone can diffuse through the boundary layer to ~~provide a diffusion-controlled reaction between the ozone and the~~ a surface of the workpiece; and

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a heater for heating the aqueous liquid to a temperature in the range of 25-150° C before the liquid is provided onto the workpiece.

28. (New) A method for processing a workpiece, comprising the steps of:
providing a liquid at a temperature in the range of about 55-120° C onto the workpiece;
introducing ozone into an environment containing the workpiece;
controlling a thickness of the liquid on the workpiece to form a liquid layer on the workpiece, with ozone diffusing through the liquid layer and reacting at the surface of the workpiece.

29. (New) The method of claim 28 wherein the liquid is at a temperature in the range of 75-115° C.

30. (New) The method of claim 28 wherein the liquid is at a temperature in the range of 85-105° C.

31. (New) The method of claim 1 wherein the liquid is at a temperature in the range of 55-100° C.

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32. (New) The method of claim 1 wherein the liquid is heated to a temperature in the range of 75-115° C.

33. (New) The method of claim 27 wherein the liquid is heated to a temperature in the range of 75-115° C.

34. (New) The method of claim 27 wherein the liquid is heated to a temperature in the range of 85-105° C.